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EXAMINER	
GAMBETTA, KELLY M	

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte AVETIK HARUTYUNYAN

Appeal 2009-004010
Application 10/658,711
Technology Center 1700

Decided: November 23, 2009

Before ALLEN R. MACDONALD, *Vice-Chief Administrative Patent Judge*, LINDA M. GAUDETTE and JEFFREY B. ROBERTSON, *Administrative Patent Judges*.

ROBERTSON, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellant appeals under 35 U.S.C. § 134(a) from the Examiner's rejection of claims 1-19.[1] (App. Br. 2). We have jurisdiction pursuant to 35 U.S.C. § 6(b).

We AFFIRM.

THE INVENTION

Appellant describes a method for synthesizing carbon nanostructures. Claim 1, reproduced below, is representative of the subject matter on appeal.

> 1. A method for synthesizing carbon nanostructures comprising:
>
> providing a substrate having a deposition mask;
>
> depositing a metalorganic layer on the substrate, wherein at least a portion of the metalorganic layer is deposited on an unmasked portion of the substrate;
>
> removing the deposition mask from the substrate;
>
> oxidizing said portion of the metalorganic layer deposited on an unmasked portion of the substrate to form a growth catalyst on the substrate; and exposing the substrate to a carbon precursor gas at a deposition temperature to form carbon nanostructures.

THE REJECTIONS

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

Kadokura	US 4,650,895	Mar. 17, 1987
Kikuchi	US 5,863,601	Jan. 26, 1999

[1] Claims 20-42 have been canceled. (Appeal Brief filed June 19, 2008, hereinafter "App. Br.," 2).

Dai	US 6,232,706 B1	May 15, 2001
Muroyama	US 2002/0036452 A1	Mar. 28, 2002

There are three grounds of rejection on appeal: (1) the Examiner rejected claims 1, 3-15, and 17-19 under 35 U.S.C. § 103(a) as being unpatentable over Dai in view of Muroyama; (2) the Examiner rejected claim 2 under 35 U.S.C. § 103(a) as being unpatentable over Dai in view of Muroyama and Kikuchi; and (3) the Examiner rejected claim 16 under 35 U.S.C. § 103(a) as being unpatentable over Dai in view of Muroyama and Kadokura.

The Examiner found that Dai discloses the recited method of synthesizing carbon nanostructures using an oxidized catalyst layer except that Dai discloses a metal layer instead of a metalorganic layer as a catalyst layer. (Examiner's Answer entered July 30, 2008, hereinafter "Ans.," 4). The Examiner found that Muroyama discloses using metalorganic layers as a catalyst to improve the selective growth of carbon nanofilm/nanostructures. (*Id.*). The Examiner concluded that it would have been obvious to modify Dai to include a metalorganic layer instead of a metal layer to improve the selective growth of carbon nanofilm/nanostructures as taught by Muroyama. (Ans. 5).

Appellant contends that Muroyama teaches away from the combination proposed by the Examiner. Specifically, Appellant argues that because Muroyama discloses that oxides of the growth catalyst should be removed prior to using the catalyst to provide for more reliable growth of the carbon film, one of ordinary skill in the art would not have substituted the metal oxide catalyst of Dai with the metalorganic catalyst of Muroyama, where the metalorganic catalyst is subsequently oxidized. (App. Br. 4-6).

ISSUE

Based on Appellant's contentions, the dispositive issue on appeal is: has Appellant shown that the Examiner reversibly erred in combining Dai with Muroyama, because Muroyama teaches away from oxidizing catalyst layers as disclosed in Dai?

FINDINGS OF FACT

The record supports the following findings of fact (FF) by a preponderance of the evidence.

1. Dai discloses a method for making aligned carbon nanotubes using an iron oxide catalyst layer formed by depositing a thin film of iron and then oxidizing the iron film. (Col. 1, ll. 6-11; col. 2, ll. 49-54).
2. Muroyama discloses a method of growing a carbon film using a metal thin layer or an organometallic (metalorganic) compound thin layer as a catalyst. (Para. [0050]).
3. Muroyama discloses "it is preferred to remove a metal oxide (so-called natural oxide film) on the surface of each metal particle or on the surface of the metal thin layer or the organometallic compound thin layer." (Para. [0095]).

PRINCIPLES OF LAW

> A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant. The degree of teaching away will of course depend on the particular facts; in general, a

> reference will teach away if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the applicant.

In re Gurley, 27 F.3d 551, 553 (Fed. Cir. 1994). In determining whether prior art references teach away from the claimed combination, the nature of the teachings is highly relevant. *Id.*

ANALYSIS

Appellant has not separately grouped the claims subject to ground of rejection (1). Accordingly, we confine our discussion to appealed claim 1 pursuant to 37 C.F.R. § 41.37(c)(1)(vii).[2]

In responding to Appellant's arguments, the Examiner stated that the native oxide layers removed in Muroyama are byproducts from excess oxygen in the deposition system of unknown thickness, composition, and catalytic activity. (Ans. 9). According to the Examiner, one of ordinary skill in the art would not be surprised that a native oxide layer is undesirable and therefore removed by Muroyama. (*Id.*). The Examiner contrasts the presence of native oxide with an oxide layer that is purposely grown with a reasonably controlled composition, thickness and catalytic activity. (*Id.*).

Appellant has not provided any persuasive evidence to rebut the Examiner's position and explain why one of ordinary skill in the art would have expected a purposely oxidized metalorganic layer of controlled

[2] Only those arguments actually made by Appellant have been considered in this decision. Arguments which Appellant could have made but chose not to make have not been considered and are deemed to be waived. *See* 37 C.F.R. § 41.37(c)(1)(vii) (2009).

composition to prevent reliable growth of a carbon film in the same manner as a native oxide. (*See* Reply Brief filed September 29, 2008, 2). Indeed, Dai purposely oxidizes the iron film layer in order to facilitate selective growth of the carbon nanotubes. (FF 1). Accordingly, Appellant has not sufficiently demonstrated that Muroyama teaches away from oxidizing a metalorganic layer used as a catalyst layer in the method of Dai.[3]

Regarding grounds of rejection (2) and (3), Appellant does not present additional arguments pertaining to limitations found in dependent claims 2 and 16, but relies solely on the arguments presented in connection with ground of rejection (1). (App. Br. 8). We are not persuaded of reversible error for the same reasons discussed above.

CONCLUSION

Appellant has failed to demonstrate that the Examiner reversibly erred in combining Dai with Muroyama, because Muroyama teaches away from oxidizing catalyst layers as disclosed in Dai.

[3] As a result, *Takeda Chemical Indus., Ltd. v. Alphapharm Pty., Ltd.*, 492 F.3d 1350 (Fed. Cir. 2007) and *Inpro II Licensing, S.A.R.L. v. T-Mobile USA, Inc.*, 450 F.3d 1350 (Fed. Cir. 2006), relied on by Appellant to support the argument that Muroyama teaches away from the combination applied by the Examiner, are not on point. (*See* App. Br. 6-7).

ORDER

We affirm the Examiner's decision rejecting claims 1-19 under 35 U.S.C. § 103(a).

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. §1.136(a)(1)(iv).

AFFIRMED

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